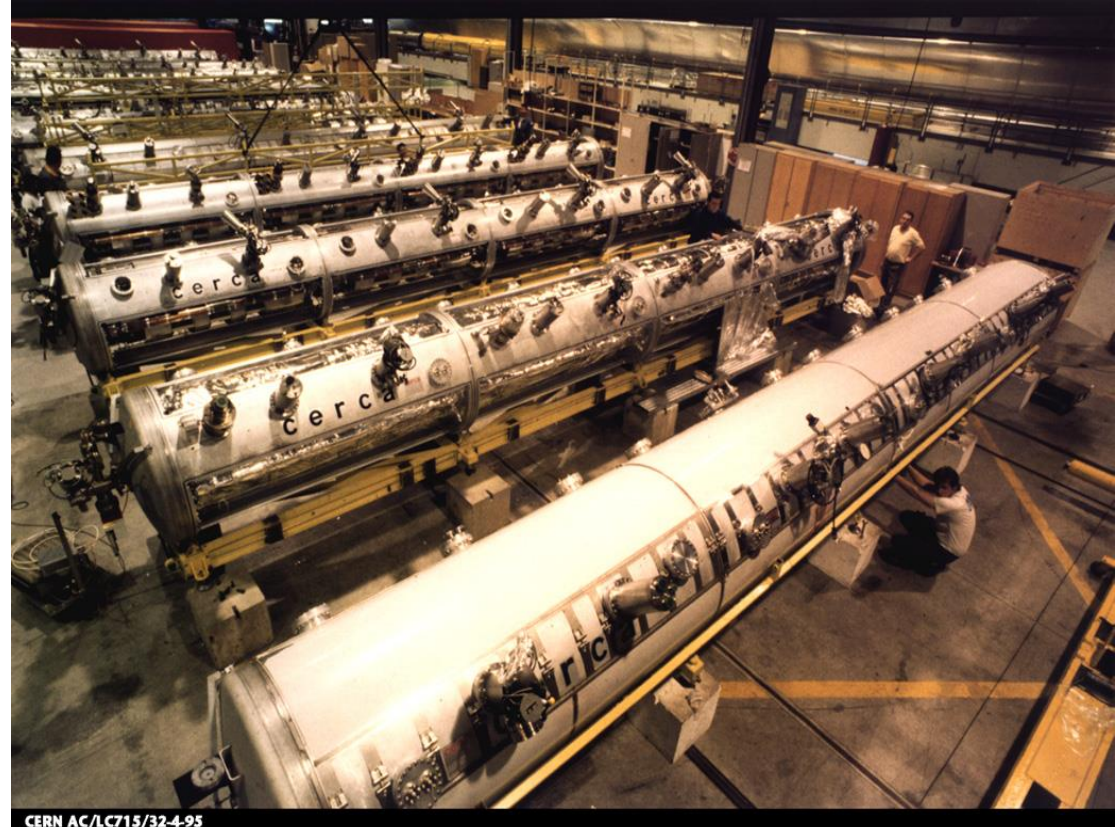


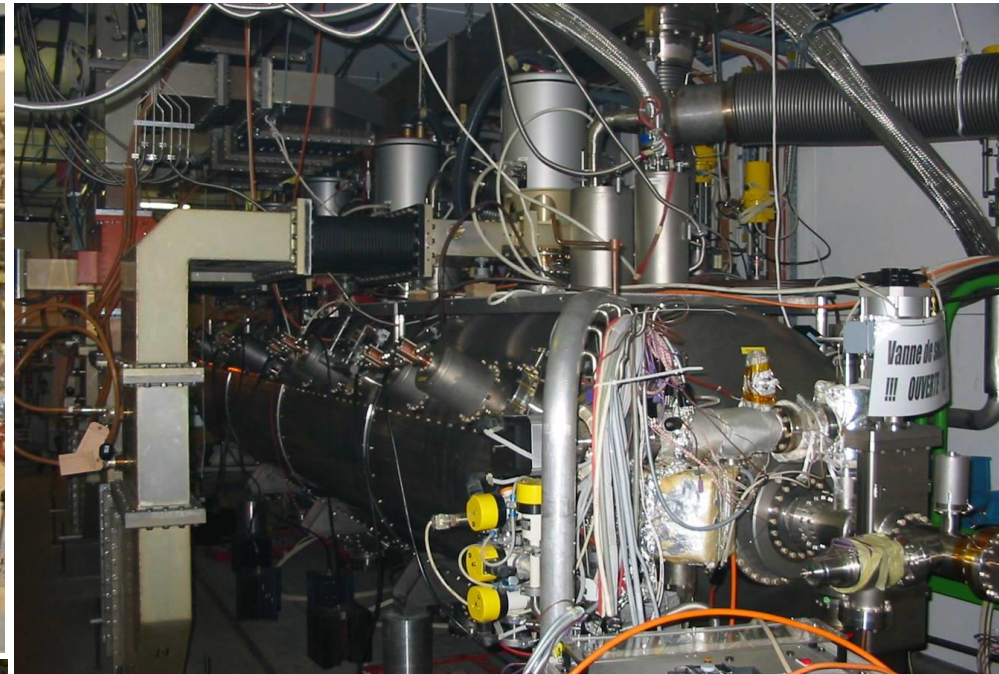


Karl Schirm and Albert Insmoby 'operate' on a superconducting radio frequency cavity in a clean room.



CERN AC/LC715/32-4-95

SM18 in the 1990's



- **First module swap last year**
- **Spare module needs refurbishing**
- **Spare cavity programme underway**



Bldg. 252: Cavity Production and Reception Area

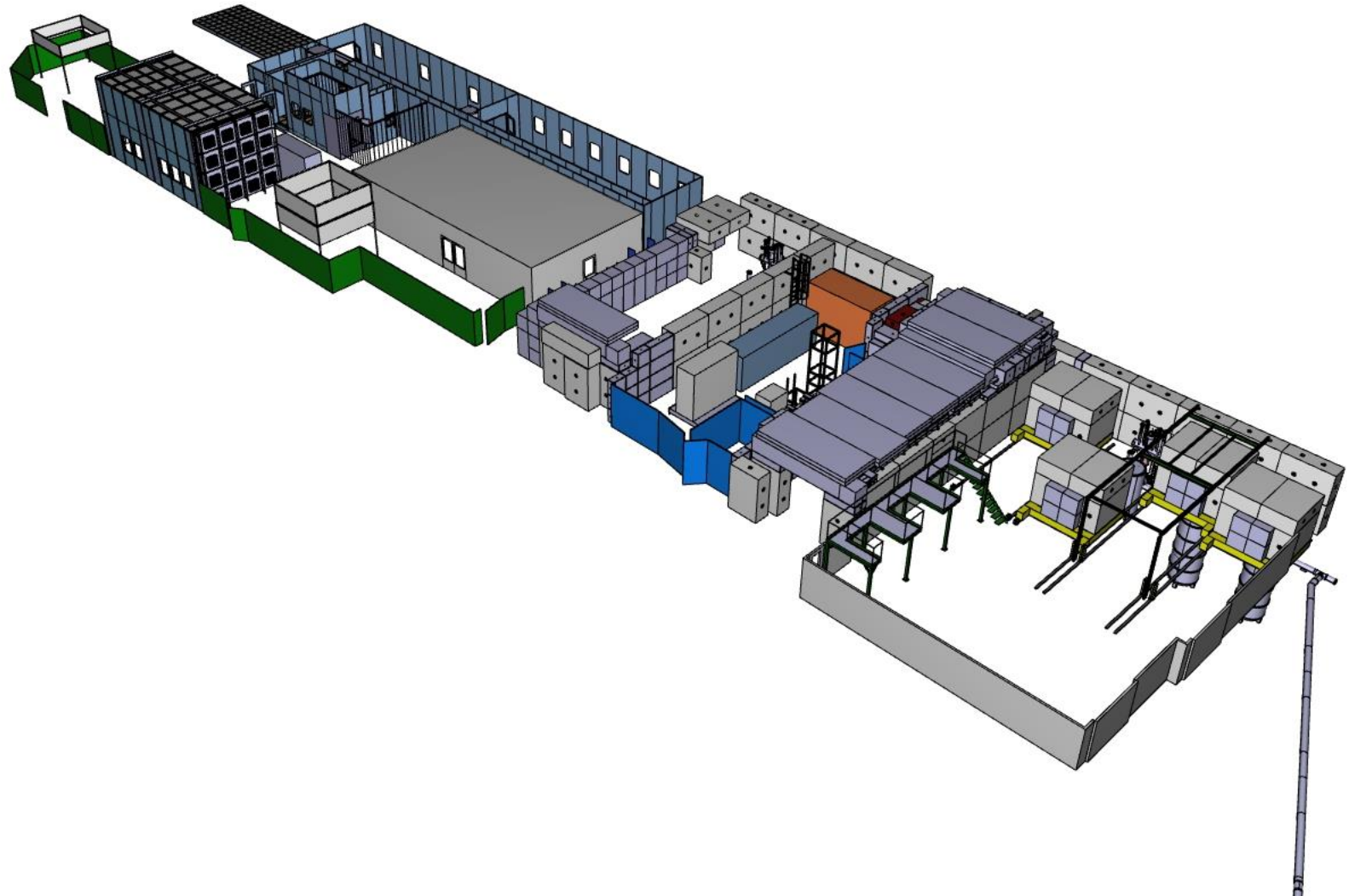




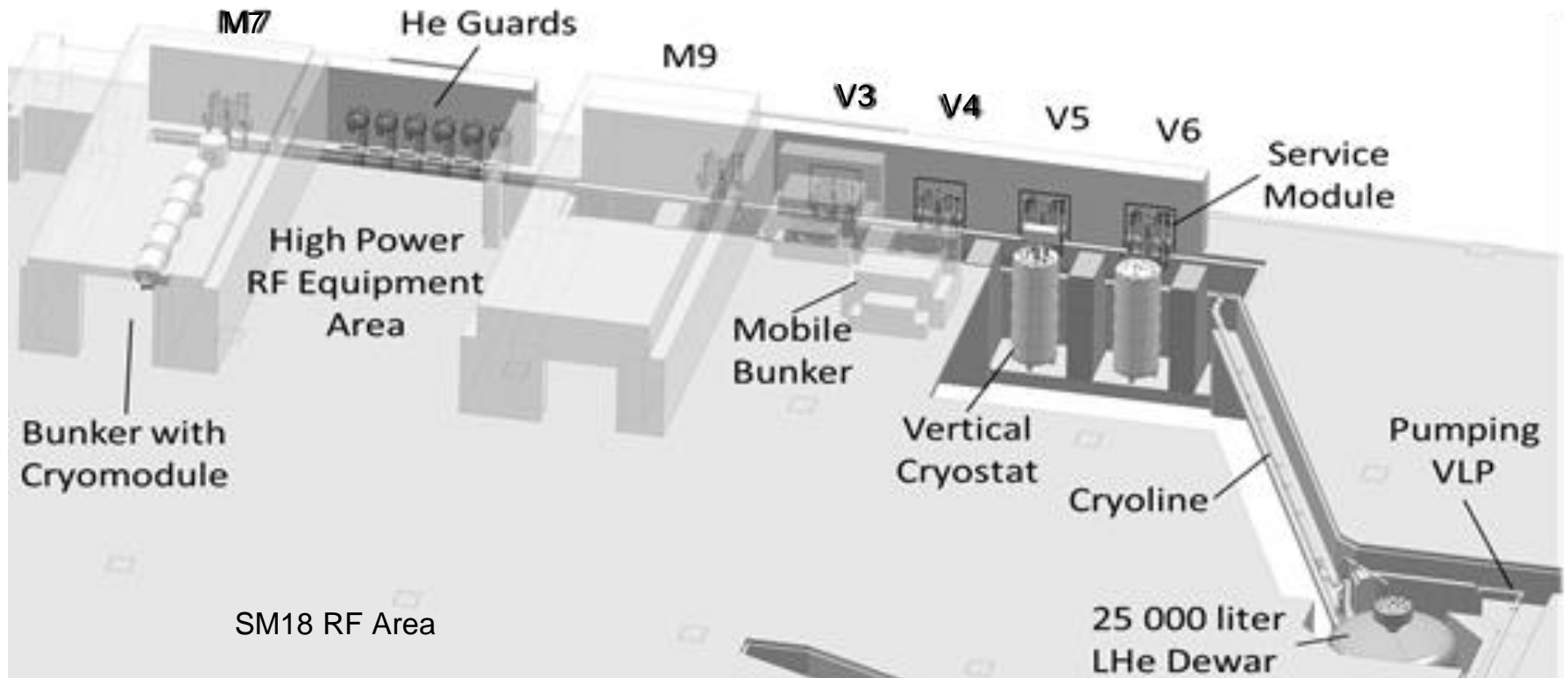
Clean Room Upgrade and Extension



SM18 SRF New Infrastructure



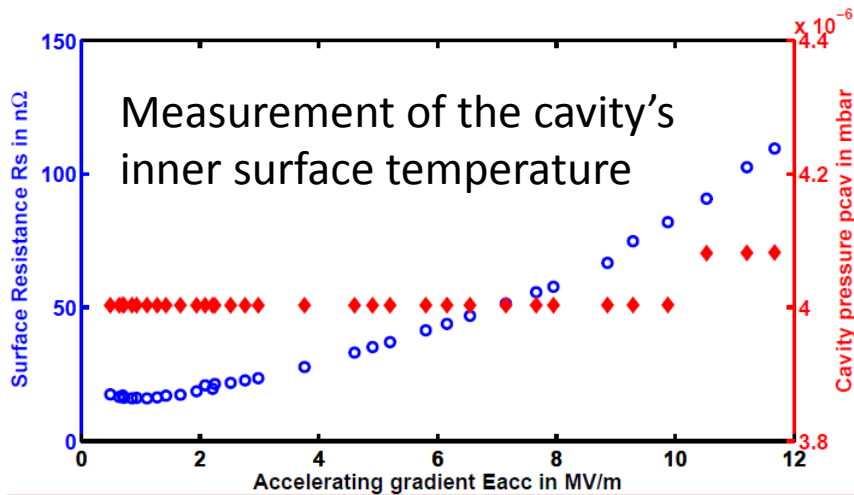
The SRF SM18 Cryogenics Upgrade



SRF Research in the Cryolab

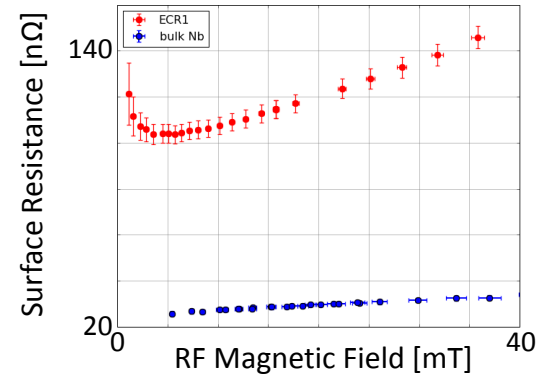
1.3 GHz HIPIMS Cavities

- High precision tests of HIPIMS cavities
- Understanding, controlling and minimizing field dependent losses of Nb/Cu cavities
- Effects studied:
 - Low temperature baking
 - Thermal cycling
 - Thermal boundary resistance

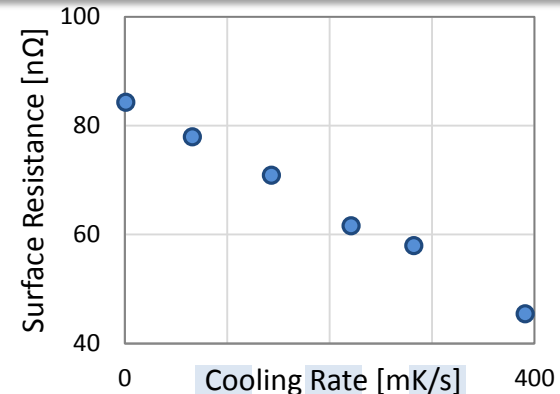


Simultaneous measurement of R_s and pressure of helium gas introduced in the cavity as a function of E_{acc} show that global warming is not the cause for the field dependent surface resistance of Nb/Cu cavities

Sample Testing with the Quadrupole Resonator

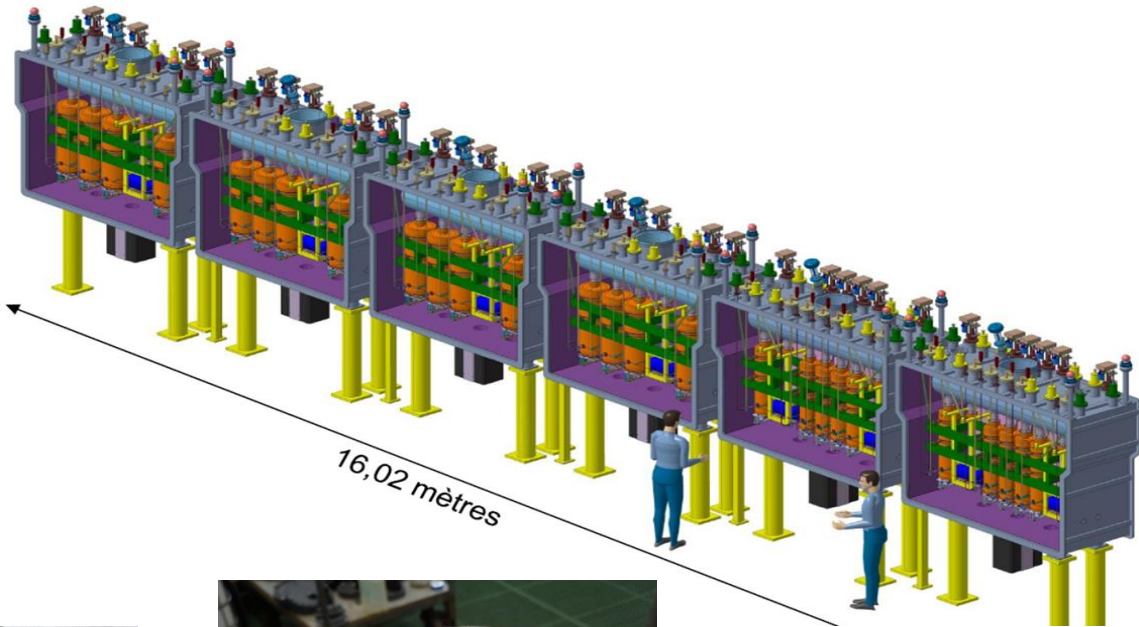


RRR does not seem to be the cause of the Q-Slope of Nb Films.

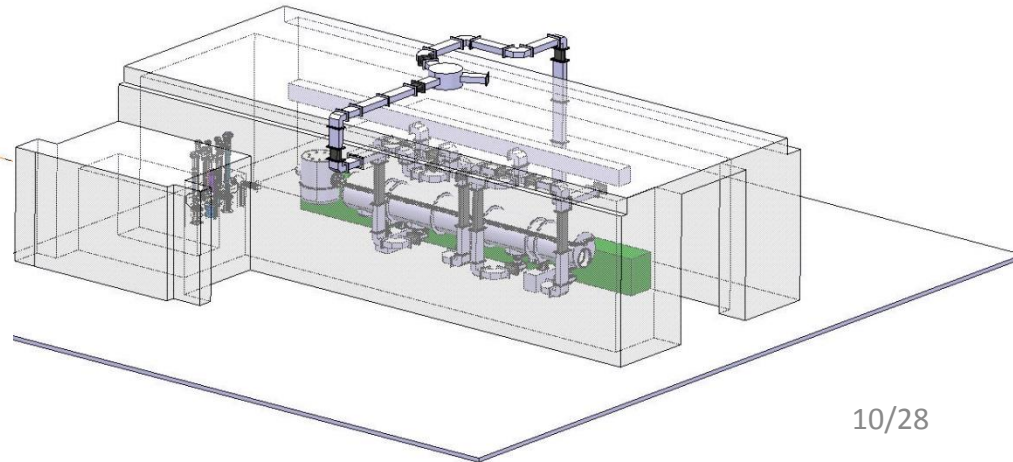
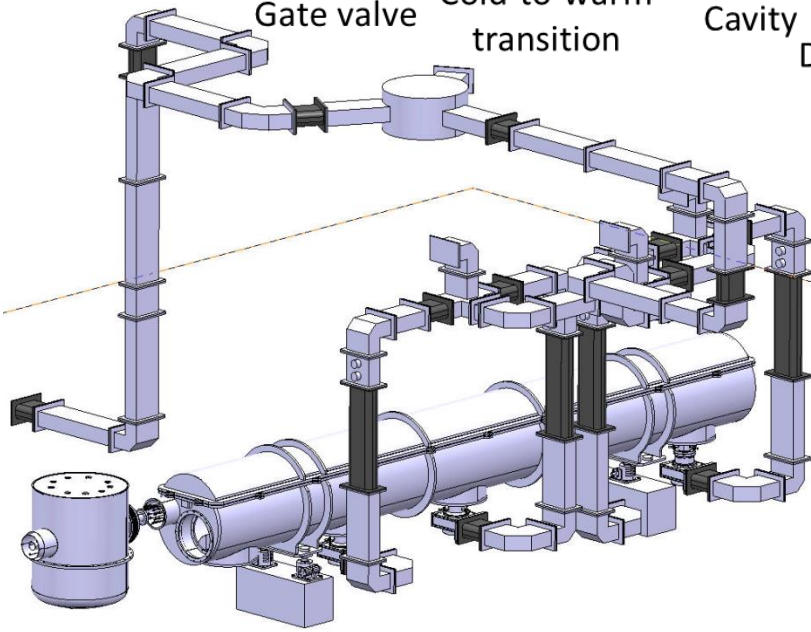
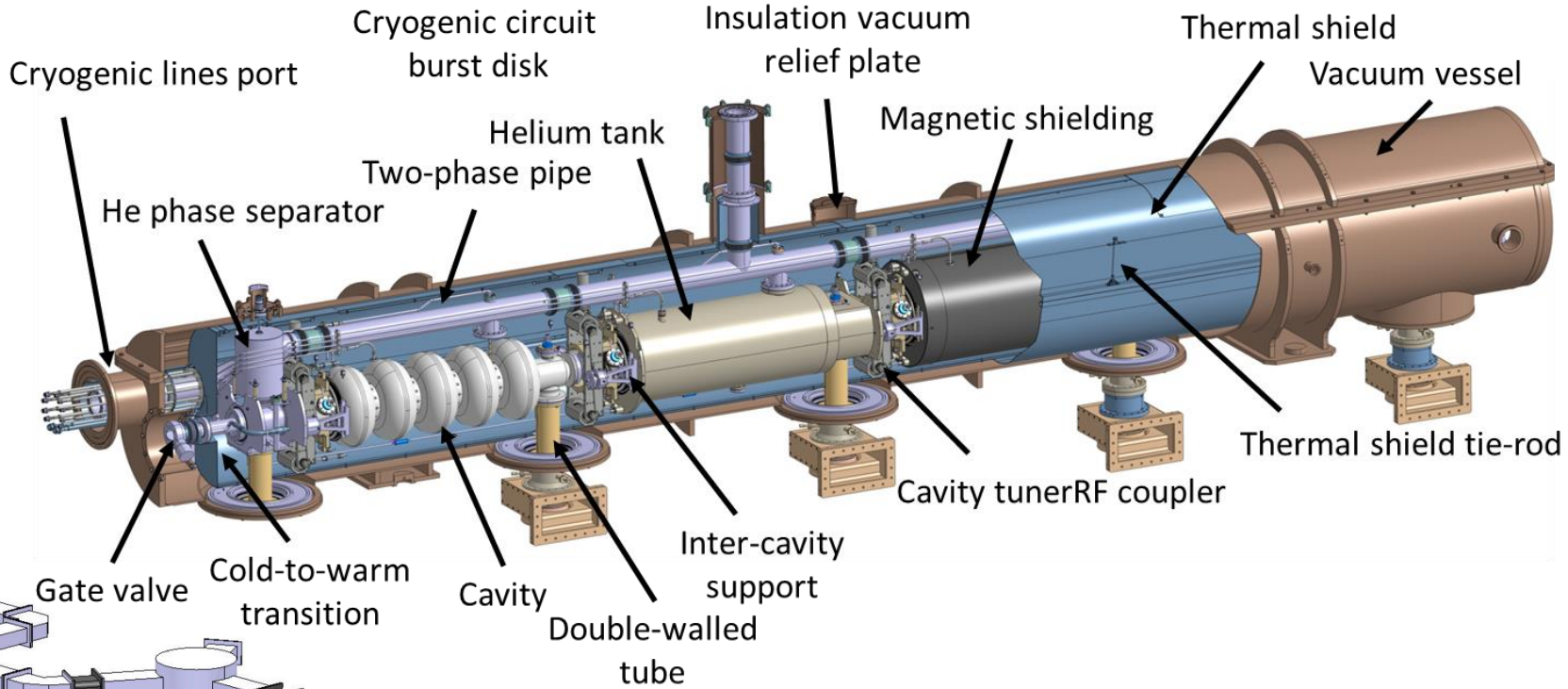


Thermal cycling has a strong impact on the R_s .

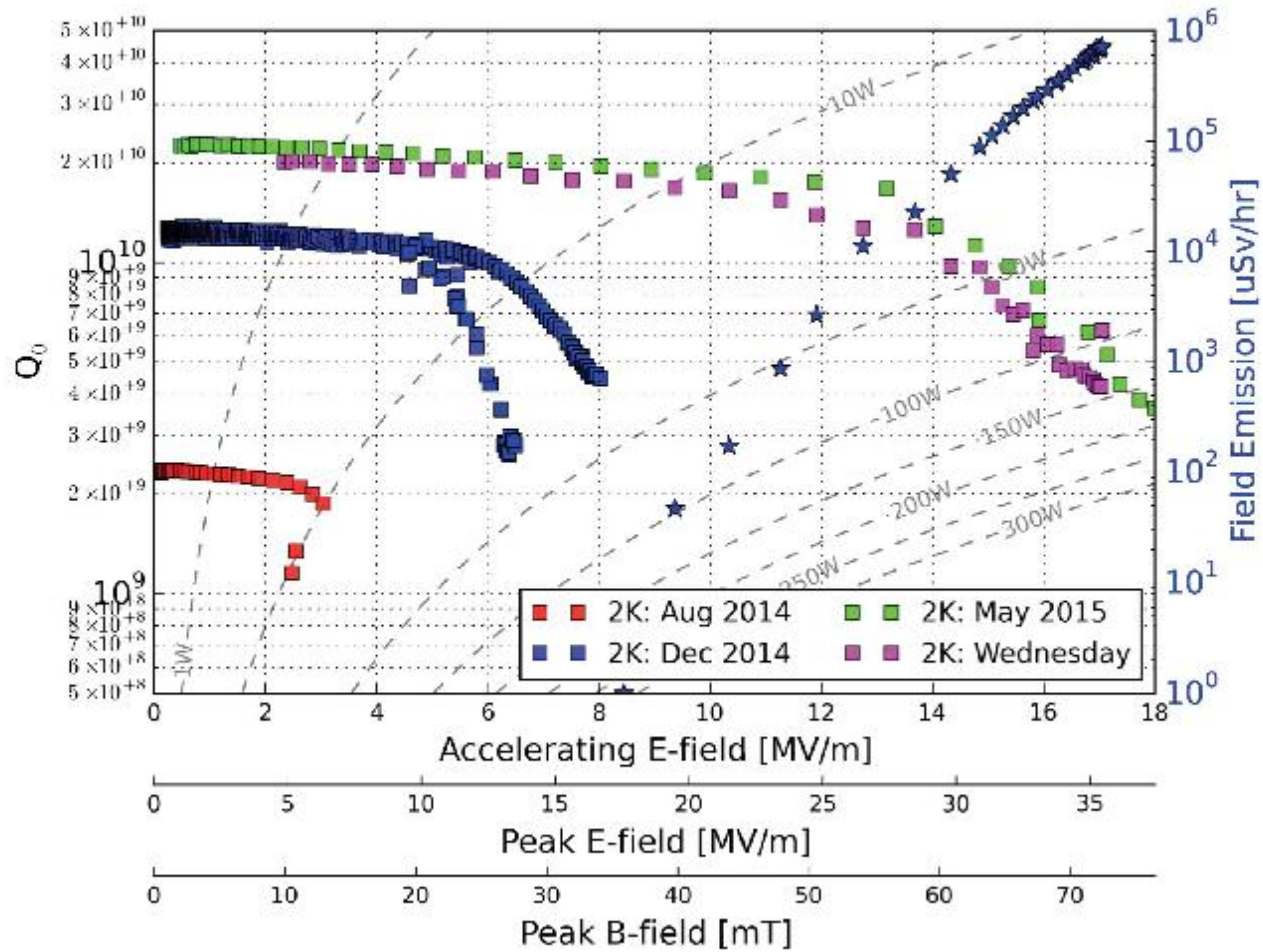
The HIE-ISOLDE Project



SPL 704 MHz half-module

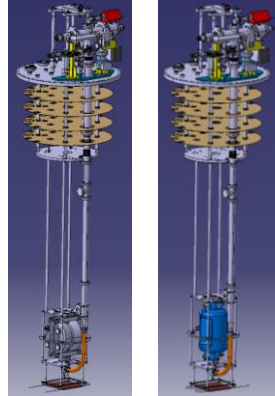


Summary From Cold Tests



Detailed scope

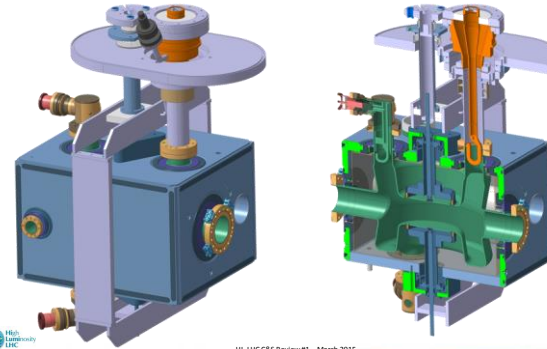
- Cavities will be cold tested independently prior assembly



HL-LHC C&S Review #1 – March 2015

Detailed scope

- Dressed cavities



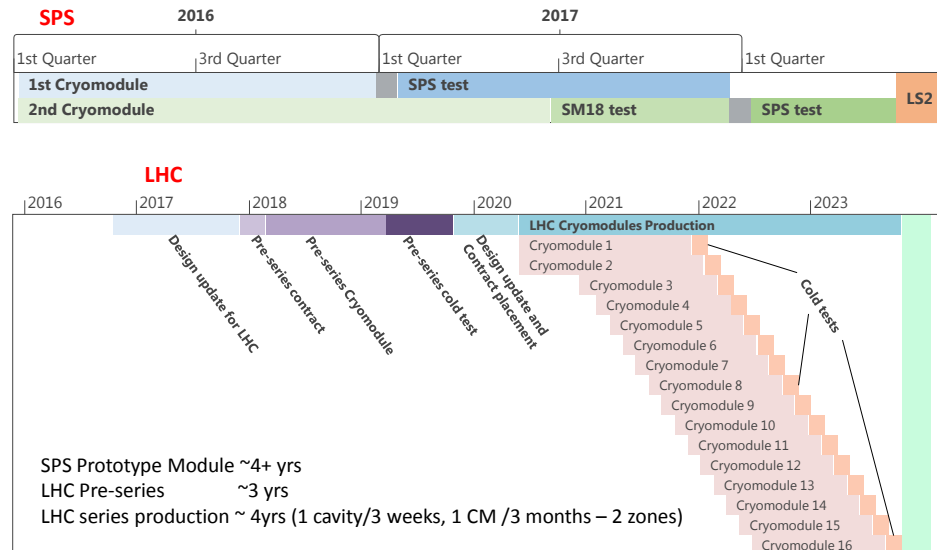
HL-LHC C&S Review #1 – March 2015

Detailed Project Phases

- **SPS Test Prototype (2013-16):**
 - Two 2-cavity modules for tests in SPS with beam (almost like in LHC)
 - Beam tests in 2017-18, with installation in year end technical stops
- **LHC Pre-Series (2016-19): LHC type**
 - 2 Modules: 1 horizontal deflection (CMS), 1 vertical deflection (ATLAS)
- **LHC Series Production (2019-2023)**
 - 16 Modules (32 Cavities) + 2 Spare Modules & associated RF systems

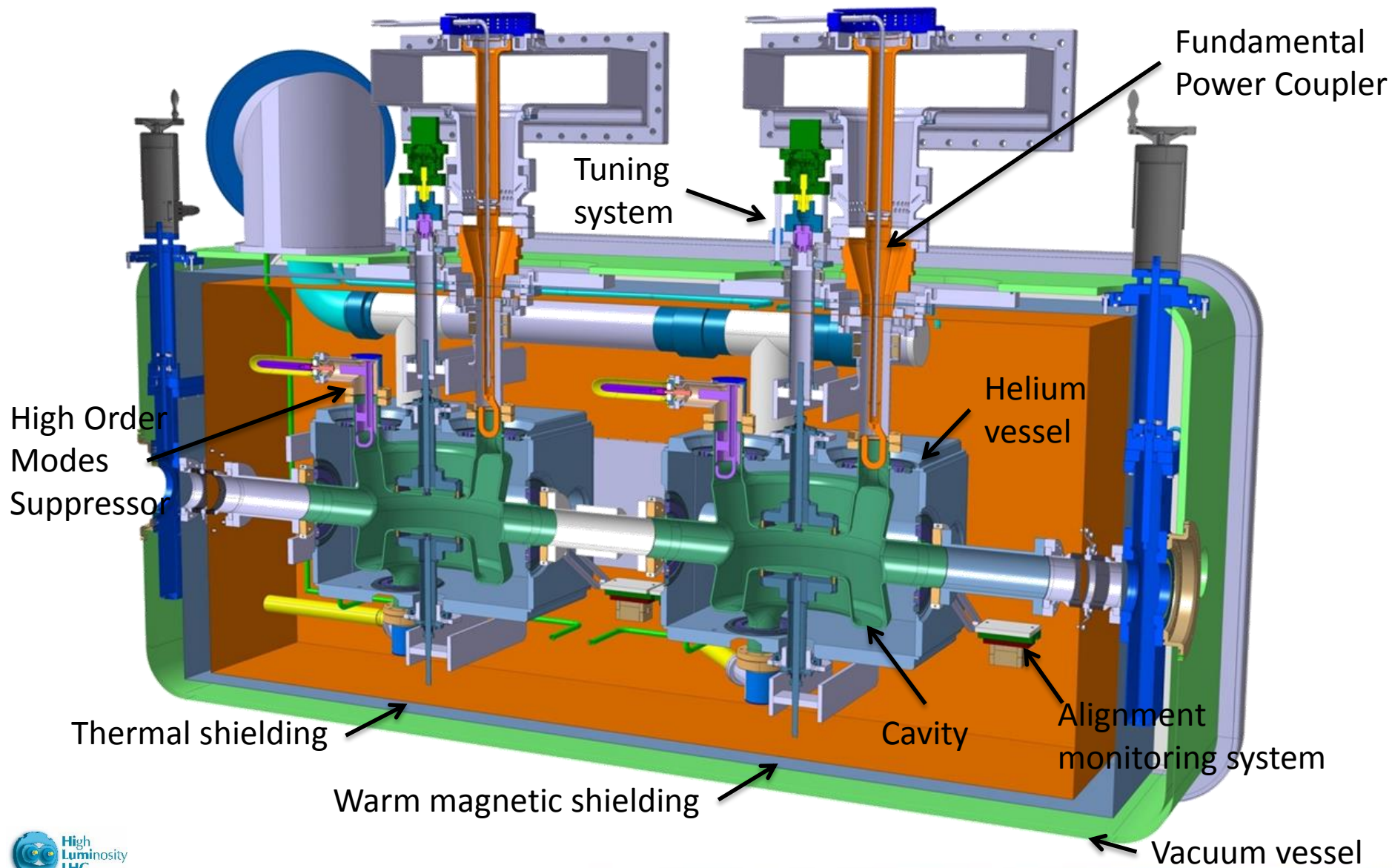
Baseline Schedule (Readable)

Details: See O. Capatina



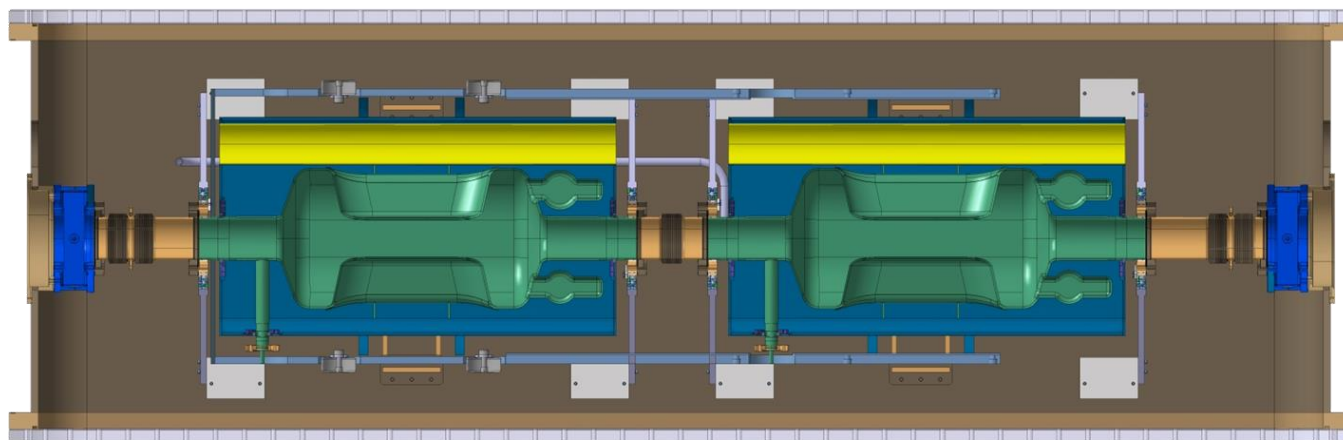
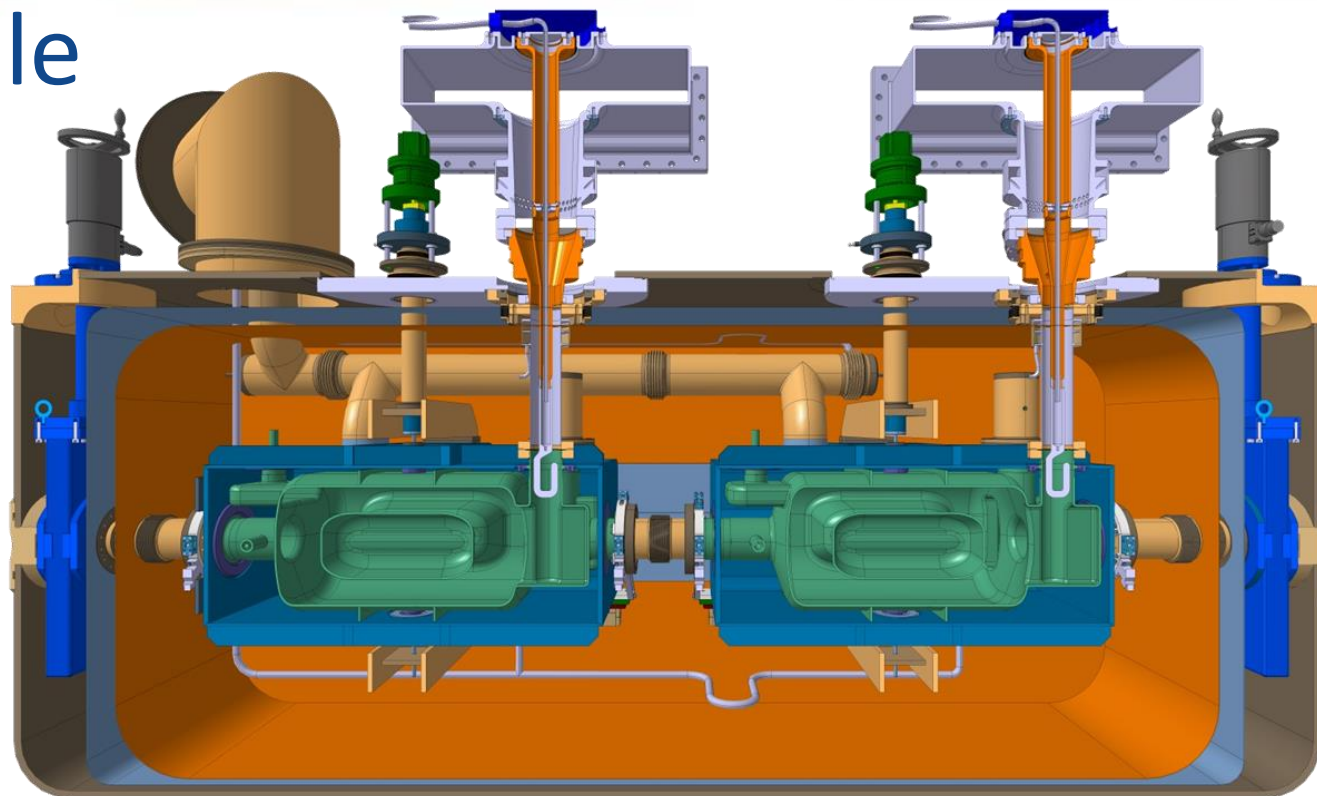
Cryomodule

Cryomodule with DQW cavities



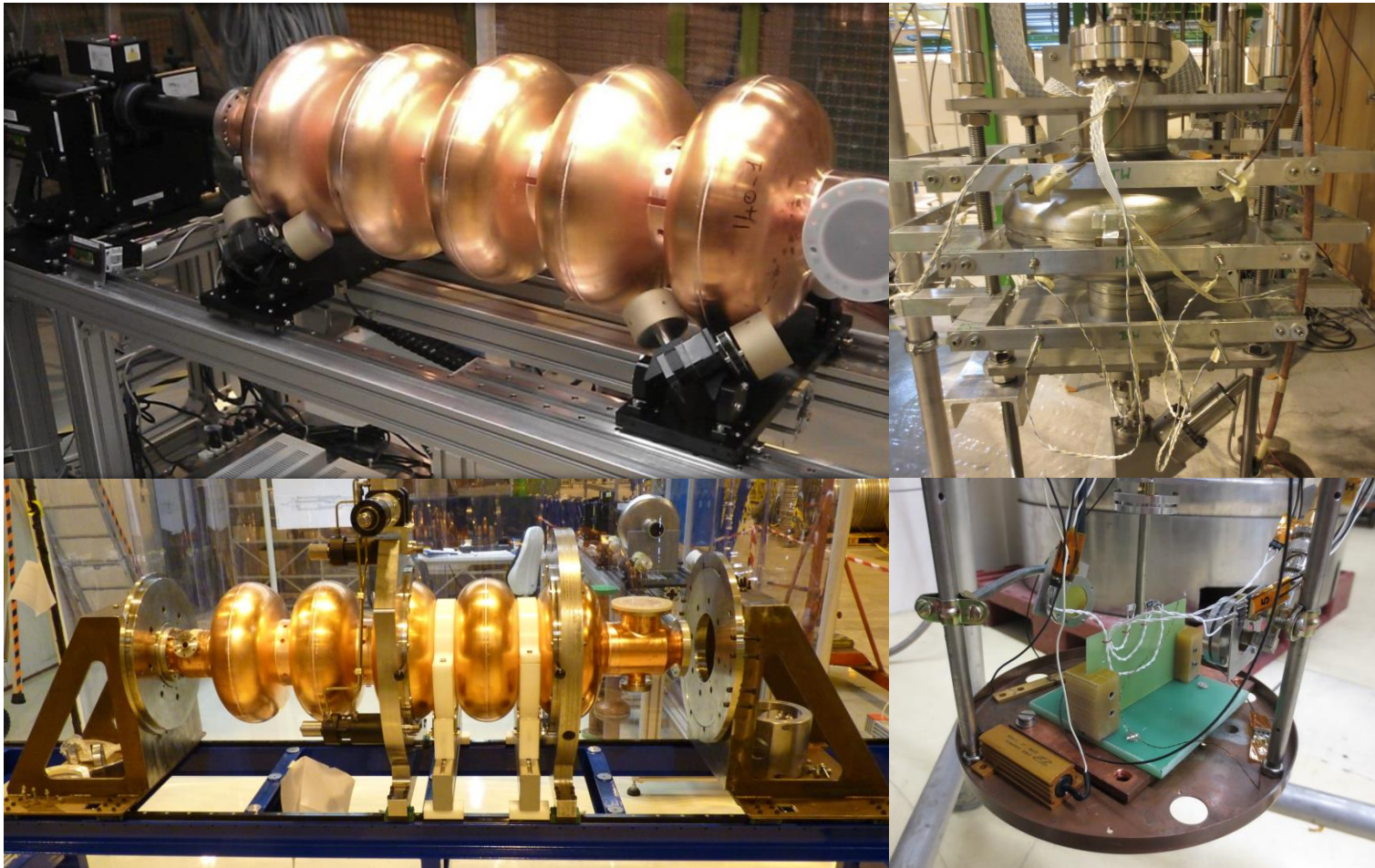
Cryomodule

Cryomodule
with RFD
cavities





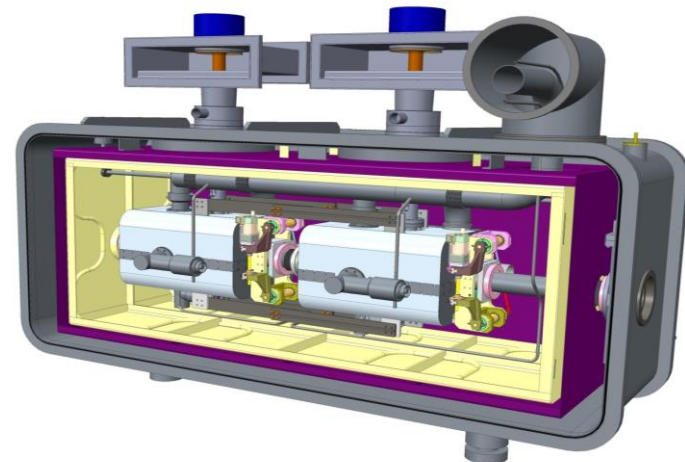
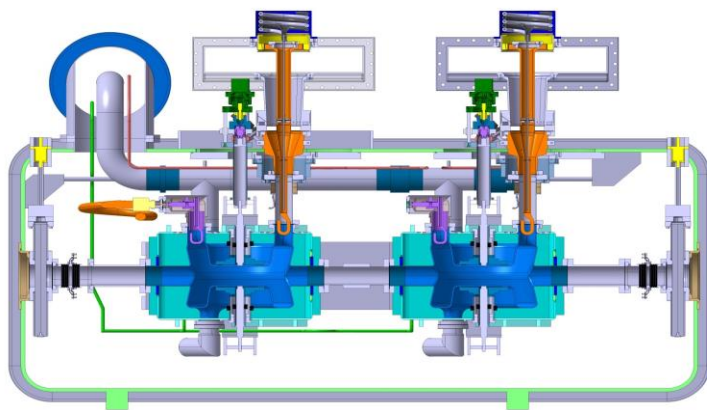
Ancillaries and Diagnostics



Horizontal bunker M7

- New long term decision
- As M9 will be used for :
 - LHC cryomodule
 - HIE-ISOLDE cryomodule
 - And later FCC 400 MHz project
- M7 will be used for :
 - SPL half cryomodule
 - CRAB cryomodules
 - And later new LHC 800 MHz project
 - -----> **Need to redesign a multipurpose cryo box !!**

| Programme | Frequency (MHz) | Cavities | Units | Modules |
|------------|-----------------|----------|-------|------------|
| LHC | 400 | 2 + 8 | 2 + 4 | 1 + 1 |
| HIE-ISOLDE | 101 | 25 | 0 | 4 |
| CRAB | 400 | ? | ? | 16 + 2 + 2 |
| SPL | 704 | 5 + ? | 4 | 1 |
| FCC | 800 (400) | ? | ? | ? |





Conclusion



- CERN SRF infrastructure and personnel today not sufficient for the medium term plan.
- Material Budget available for partly compensation of needs.
- Student and fellow requests underway for ramp-up of activities. Exchange with collaborations encouraged.
- Some projects rely on In-Kind contributions from collaborations – follow-up essential.